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Proposed Techniques for Assisting the Screening
of Potential College of Home Economics Freshmen

by J. Stanley Ahmann, Cornell University
Thomas G. Bentson, Cornell University, 1952

In the process of screening potential freshmen for the College of Home Economics, consideration has been individually given to the candidate's high school grade point average, her mathematical score on the Scholastic Aptitude Test of the College Entrance Examination Board, and her verbal score on the same test. However, it would seem desirable to investigate the relative importance of the three variables, when considered in combination, in regard to a candidate's possible academic success in the College of Home Economics. The linear regression computations described in the following paragraphs is an attempt to determine this relative importance, and to reduce the findings to an administratively feasible scheme by means of which future candidates could be partially screened.

A total of 330 home economics freshmen of the classes of 1953, 1954, and 1955 were included in the investigation. Since there was no reason to believe that these students would differ appreciably from home economics students of the foreseeable future, it was assumed that the results of a study of this group would be, for all practical purposes, typical of home economics students in coming years. Therefore, a study was made of relationships existing between the three variables previously mentioned and the cumulative second term grade point averages at Cornell University. In Table 1 are shown all possible zero order coefficients of correlation between the variables. All coefficients were significantly different from zero.

Table 1

Relationship of Three Variables to
Cumulative Second Term Averages of
330 College of Home Economics Freshmen

Variables	S.A.T. Verbal Score	S.A.T. Math Score	Cumulative Second Term Average
High School Average	.216	.301	.409
S.A.T. Verbal Score		.269	.374
S.A.T. Math Score			.226

The sizes of the correlations in the table suggest that the multiple coefficient of correlations between cumulative second term grade point averages and a combination of the three variables might be large. However, it was found to be .50. Although this value is large enough to warrant further investigation, it is smaller than would be considered desirable.

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The multiple regression equation in which a combination of the three variables was used to predict cumulative second term grade point averages is summarized in Table 2.

Table 2

Weightings of Three Prediction Variables
and Relative Importance of Each in Predicting
Second Term Grade Point Averages

Prediction Variable	Weight	Relative Importance (Per Cent)
S.A.T. Math Score	0.0024	7.9
S.A.T. Verbal Score	0.0124	41.2
High School Average	0.4225	50.9

It is apparent that the S.A.T. verbal score was contributing approximately five times more to the prediction of the term average than was the S.A.T. mathematical score. Also, the high school grade point average was approximately six times more important in the prediction battery than was the S.A.T. mathematical score. This suggested the possibility of dropping the S.A.T. mathematical score from the equation.

The attempted elimination of the S.A.T. mathematical score was successful. Reducing the regression equation to two prediction variables did not cause a significant loss in ability to predict ($F = 0.93$). The new regression equation is shown in Table 3.

Table 3

Weightings of Two Prediction Variables
and the Relative Importance of Each in
Predicting Second Term Grade Point Averages

Prediction Variable	Weight	Relative Importance (Per Cent)
S.A.T. Verbal Score	0.0129	44.7
High School Average	0.4392	55.3

It should be noted that the weights in Table 3 were changed only slightly from the corresponding weights listed in Table 2. Furthermore, the relative importance of the two variables was about the same although the high school grade point average was slightly more important.

In complete form, the regression equation was

$$Y = 0.0129 X_1 + 0.4392 X_2 + 31.3590$$

where

Y = cumulative second term grade point average

X_1 = S.A.T. verbal score

X_2 = high school grade point average

If an estimate of a candidate's cumulative second term grade point average were desired, and this estimate were to be made before the candidate was admitted to the College of Home Economics, it could be obtained by multiplying her S.A.T. verbal score by 0.0129, her high school grade point average by 0.4392, and adding the sum of the two products to 31.3590.

To reduce the administrative procedure to a mere glance at a table, the equation was solved successively and the results tabulated in Table 4.

Table 4

Predicted Cumulative Second Term Grade
Point Average Based on S.A.T. Verbal
Scores and High School Grade Point Averages

S.A.T. Verbal Scores	High School Grade Point Averages					
	80-82	83-85	86-88	89-91	92-94	95 and over
775-800	77.2	78.6	79.9	81.2	82.5	84.3
750-774	76.9	78.3	79.6	80.9	82.2	84.0
725-749	76.6	78.0	79.3	80.6	81.9	83.7
700-724	76.3	77.7	79.0	80.3	81.6	83.4
675-699	75.9	77.3	78.6	79.9	81.2	83.0
650-674	75.6	77.0	78.3	79.6	80.9	82.7
625-649	75.3	76.7	78.0	79.3	80.6	82.4
600-624	75.0	76.4	77.7	79.0	80.3	82.1
575-599	74.6	76.0	77.3	78.6	79.9	81.7
550-574	74.3	75.7	77.0	78.3	79.6	81.4
525-549	74.0	75.4	76.7	78.0	79.3	81.1
500-524	73.7	75.1	76.4	77.7	79.0	80.8
475-499	73.3	74.7	76.0	77.3	78.6	80.4
450-474	73.0	74.4	75.7	77.0	78.3	80.1
425-449	72.7	74.1	75.4	76.7	78.0	79.8
400-424	72.4	73.8	75.1	76.4	77.7	79.5
375-399	72.0	73.4	74.7	76.0	77.3	79.1
350-374	71.7	73.1	74.4	75.7	77.0	78.8
325-349	71.4	72.8	74.1	75.4	76.7	78.5
300-324	71.1	72.5	73.8	75.1	76.4	78.2

When the two scores are known for any candidate, she can be readily located in the table and a predicted term average noted, this prediction being based upon evidence from an earlier group of home economics freshmen.

The limits of Table 4 for both prediction variables were based on the ranges found in the group of 330 freshmen. The spread of the predicted term averages from a low of 71.1 to a high of 84.3 is disappointing in part although it was anticipated when the multiple coefficient of correlation was found to be .50. Since the 330 freshmen were a selected group and thus tended to be a relatively homogeneous group with respect to scholastic aptitude and high school achievement, the correlation would undoubtedly be relatively low.

As is true with regression equations of this type, a single prediction of academic achievement might later be found to be in error. There is little doubt that the use of Table 4 would allow the entrance of a few candidates who would ultimately fail academically, and would deny entrance to a few who would have been academically successful. With repeated use, however, the decision in the vast majority of the cases would be proper. On the basis of the evidence presented by the group of freshmen studied, the prediction of second term cumulative grade point averages on the basis of two prediction variables will not be wrong by more than 3.1 points in 68% of the predictions one might make.

It would seem that the utility of Table 4 is based in part on the willingness of officials in the admissions office to decide at least tentatively how low a predicted term average must be before it indicates a student of doubtful academic promise. Even if such a decision is not possible, however, the instrument can still be considered to provide another piece of evidence to be evaluated in the final decision concerning the approval of a candidate's request for admission.